**Contamination sources**          Probability of
                                   contamination = Pa + Pb + Pc

| Crime scene | → | Investigators<br>Scientists<br>Reagents<br>Pa |

| ERU | → | Scientists<br>Reagents<br>Plasticware<br>Pb |

| DNA unit | → | Scientists<br>Reagents<br>Plasticware<br>Pc |
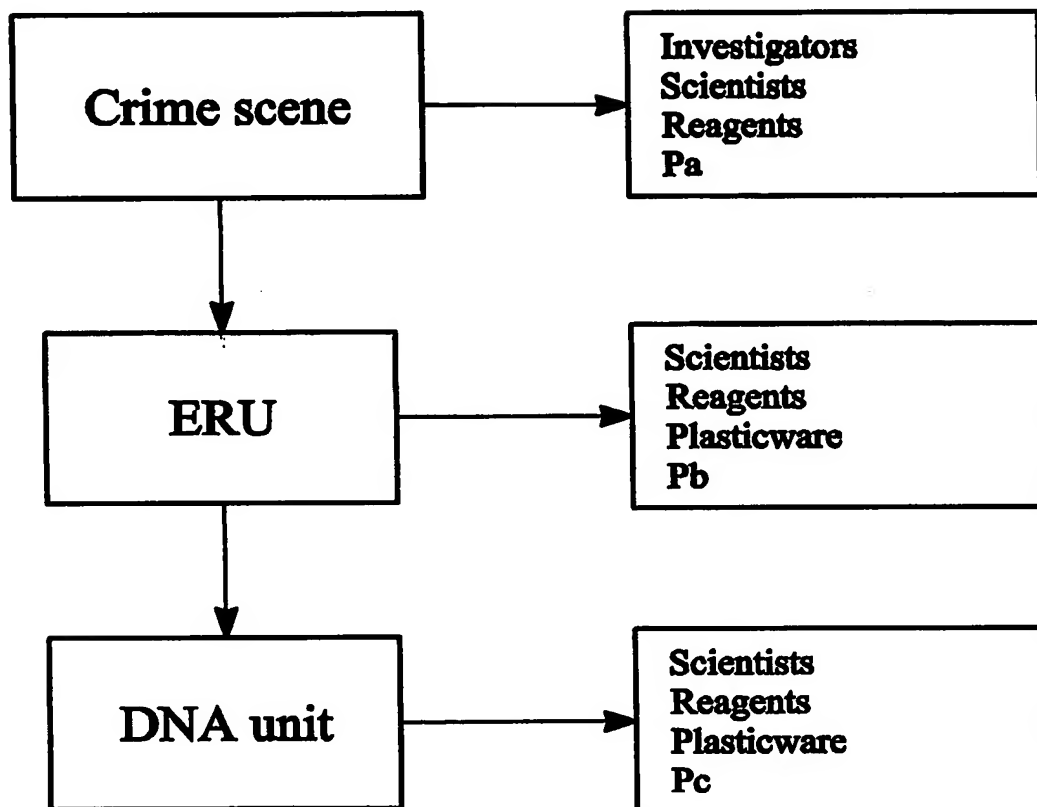
FIG.    1

# FIG. 2

Comparison of peak heights > 0 across all loci,
plotted for negative controls (a population of 26 samples)
and for casework samples (a population of 50 samples). MATLAB.HISTCALC
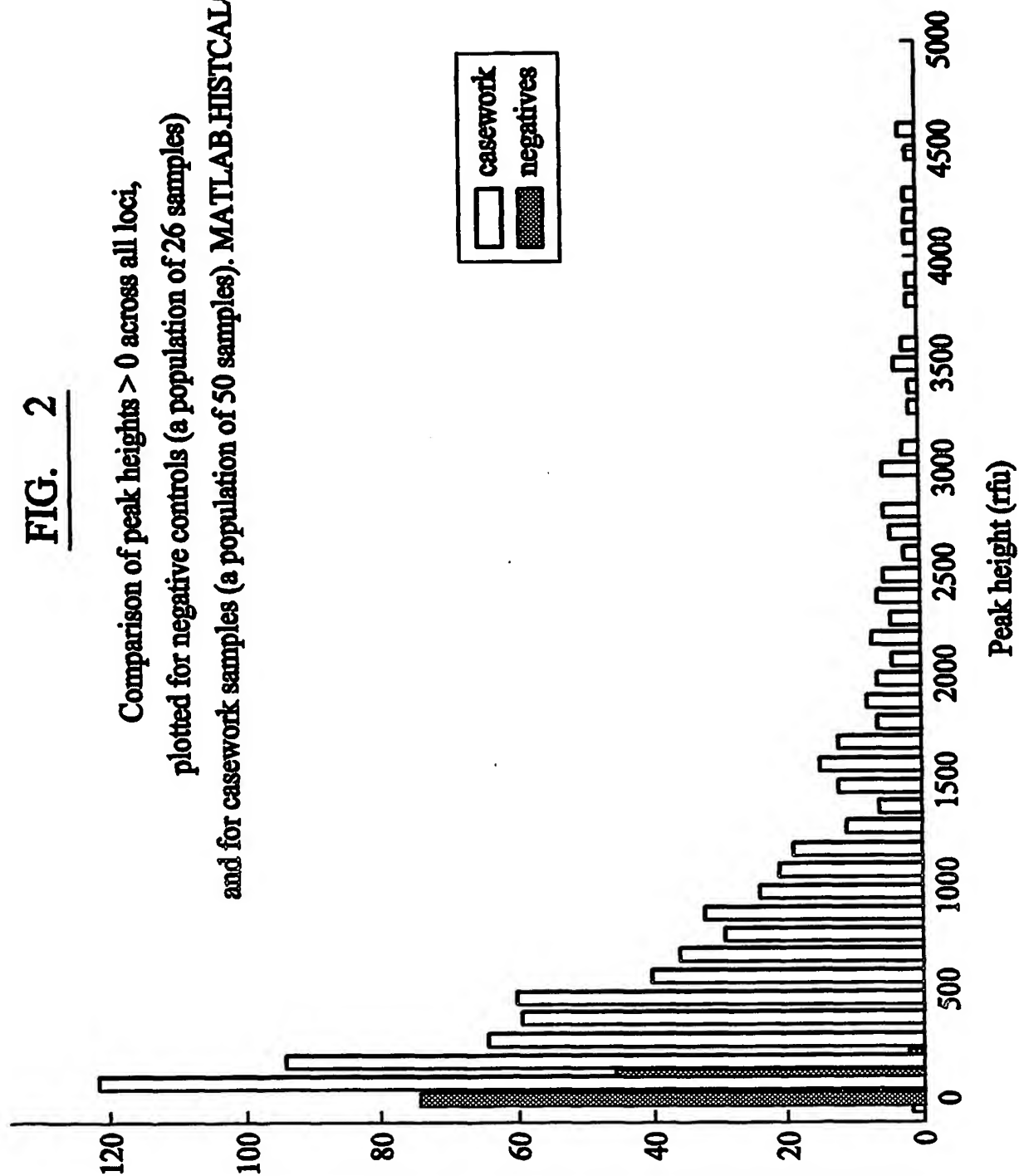
| Sum peak height | no. alleles | | | | | Sample no. |
|---|---|---|---|---|---|---|
| | >0rfu | >25rfu | >50rfu | >100rfu | >150rfu | |
| 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 0 | 0 | 0 | 0 | 0 | 0 | 38 |
| 0 | 0 | 0 | 0 | 0 | 0 | 44 |
| 0 | 0 | 0 | 0 | 0 | 0 | 49 |
| 54 | 1 | 1 | 1 | 0 | 0 | 23 |
| 142 | 2 | 2 | 2 | 0 | 0 | 30 |
| 424 | 4 | 4 | 4 | 3 | 1 | 29 |
| 763 | 5 | 5 | 5 | 3 | 3 | 47 |
| 1310 | 7 | 7 | 7 | 3 | 3 | 32 |
| 1556 | 13 | 13 | 13 | 7 | 2 | 31 |
| 1595 | 13 | 13 | 13 | 8 | 4 | 14 |
| 1644 | 16 | 16 | 16 | 6 | 3 | 9 |
| 1784 | 13 | 13 | 13 | 10 | 5 | 42 |
| 1784 | 13 | 13 | 13 | 10 | 5 | 50 |
| 1908 | 14 | 14 | 14 | 9 | 7 | 15 |
| 2686 | 10 | 10 | 10 | 9 | 9 | 39 |
| 3806 | 17 | 17 | 17 | 15 | 14 | 4 |
| 3970 | 19 | 19 | 19 | 16 | 14 | 8 |
| 4016 | 19 | 19 | 19 | 15 | 12 | 35 |
| 4126 | 22 | 22 | 22 | 21 | 19 | 12 |
| 4161 | 19 | 19 | 19 | 19 | 19 | 22 |
| 4509 | 12 | 12 | 12 | 9 | 8 | 17 |
| 5001 | 14 | 14 | 14 | 14 | 14 | 34 |
| 7255 | 16 | 16 | 16 | 16 | 16 | 13 |
| 7917 | 21 | 21 | 21 | 21 | 21 | 45 |
| 7988 | 18 | 18 | 18 | 18 | 18 | 41 |
| 8250 | 18 | 18 | 18 | 16 | 16 | 43 |
| 8303 | 22 | 22 | 22 | 20 | 19 | 7 |
| 8512 | 15 | 15 | 15 | 15 | 15 | 26 |
| 9522 | 20 | 20 | 20 | 20 | 20 | 2 |
| 11304 | 20 | 20 | 20 | 20 | 20 | 40 |
| 11346 | 21 | 21 | 21 | 21 | 21 | 46 |
| 11689 | 19 | 19 | 19 | 19 | 19 | 27 |
| 13219 | 20 | 20 | 20 | 20 | 20 | 16 |
| 15011 | 20 | 20 | 20 | 20 | 20 | 11 |
| 15771 | 18 | 18 | 18 | 18 | 18 | 24 |
| 16919 | 20 | 20 | 20 | 20 | 20 | 37 |
| 17805 | 20 | 20 | 20 | 20 | 19 | 18 |
| 18387 | 22 | 22 | 22 | 22 | 22 | 33 |
| 21198 | 22 | 22 | 22 | 22 | 22 | 48 |
| 22353 | 20 | 20 | 20 | 20 | 20 | 3 |
| 25086 | 19 | 19 | 19 | 19 | 19 | 25 |
| 27543 | 21 | 21 | 21 | 21 | 21 | 6 |
| 36804 | 18 | 18 | 18 | 18 | 18 | 19 |
| 40367 | 19 | 19 | 19 | 19 | 19 | 20 |
| 41817 | 20 | 20 | 20 | 20 | 20 | 28 |
| 42273 | 21 | 21 | 21 | 21 | 21 | 1 |
| 45110 | 19 | 19 | 19 | 19 | 19 | 21 |
| 73211 | 21 | 21 | 21 | 21 | 21 | 36 |

Table 1 : Case samples ranked in order of increasing summed peak height with numbers of allales scored above a given peak height.

## FIG.    3

| Sum peak height | no. alleles | | | | | | | Sample no. |
|---|---|---|---|---|---|---|---|---|
| | >0 | >25 | >50 | >100 | >150 | >200 | >250 | |
| 1217 | 16 | 16 | 16 | 5 | 3 | 0 | 0 | 26 |
| 1109 | 17 | 17 | 9 | 4 | 2 | 2 | 1 | 15 |
| 695 | 11 | 10 | 6 | 1 | 1 | 1 | 1 | 3 |
| 481 | 11 | 11 | 3 | 0 | 0 | 0 | 0 | 16 |
| 413 | 8 | 6 | 2 | 2 | 1 | 0 | 0 | 1 |
| 334 | 10 | 9 | 0 | 0 | 0 | 0 | 0 | 8 |
| 290 | 7 | 6 | 2 | 0 | 0 | 0 | 0 | 14 |
| 242 | 7 | 5 | 1 | 0 | 0 | 0 | 0 | 4 |
| 234 | 5 | 4 | 3 | 0 | 0 | 0 | 0 | 2 |
| 226 | 4 | 4 | 2 | 0 | 0 | 0 | 0 | 9 |
| 140 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 20 |
| 104 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 17 |
| 67 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| 64 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 18 |
| 60 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 5 |
| 51 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 24 |
| 50 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| 50 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 10 |
| 50 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 19 |
| 46 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 13 |
| 36 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 12 |
| 36 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 25 |
| 33 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 21 |
| 33 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 23 |
| 31 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 11 |
| 16 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |

FIG. 4

Table 2 : Negative controls ranked in descending order of intensity, taken from a population of 295 negative controls - only 26 controls that gave a signal are listed ie 275 controls were blank.

| Mixture (Mx) | No. observations | Probability |
|---|---|---|
| *Case sample only* | 12105 | 0.8207 |
| *Negative sample only* | 130 | 0.0088 |
| *no sample* | 1345 | 0.0912 |
| <= .1 > 0 | 973 | 0.0660 |
| <= .2 > .1 | 73 | 0.0049 |
| <= .3 > .2 | 30 | 0.0020 |
| <= .4 > .3 | 19 | 0.0013 |
| <= .5 > .4 | 9 | 0.0006 |
| <= .6 > .5 | 9 | 0.0006 |
| <= .7 > .6 | 9 | 0.0006 |
| <= .8 > .7 | 4 | 0.0003 |
| <= .9 > .8 | 6 | 0.0004 |
| <= 1 > .9 | 5 | 0.0003 |
| <= 2 > 1 | 11 | 0.0007 |
| <= 10 > 2 | 19 | 0.0013 |
| <= 25 > 10 | 3 | 0.0002 |
| Total | 14750 | |

## FIG.  5

| Guideline (rfu) | | | | | | |
|---|---|---|---|---|---|---|
| Log10 LR | rfu = 50 | rfu = 60 | rfu = 70 | rfu = 80 | rfu = 90 | rfu = 100 |
| 1 | 0.00746 | 0.00502 | 0.00319 | 0.00251 | 0.00339 | 0.00339 |
| 2 | 0.00217 | 0.00095 | 0.00014 | 0.00088 | 0 | 0 |
| 3 | 0.00027 | 0.00041 | 0.00210 | 0 | 0 | 0 |
| 4 | 0.00095 | 0.00183 | 0 | 0 | 0 | 0 |
| 5 | 0.00014 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0.00007 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0.00020 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0.00088 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 4: Probability estimates for achieving a given likelihood ratio where a laboratory contaminant is responsible for the major (unmixed) profile.

## FIG.  6

Histogram showing probability of a contaminant giving a
reportable result (measured as log10 LR) relative to the reporting guideline (currently 50rfu)

**FIG. 7**